AMENDMENT TO THE CLAIMS

Please cancel claims 2-4, 6-8, 13, 15-17, and 30-33.

Please amend claims 1, 5, 9, 12, 14, 18, 19, 20, 23-29, and 37 as shown.

Please add new claims 38-41.

1. (Currently amended) A solid oxide fuel cell system comprising

(a) at least one tubular solid oxide fuel cell comprising a ceramic solid state electrolyte layer and inner and outer electrode layers concentrically arranged around and sandwiching the electrolyte layer, the inner electrode layer fluidly communicable with only one of an oxidant reactant and a fuel reactant, and the outer electrode layer fluidly communicable with only the other of the oxidant and fuel reactants; and

(b) a combustion heater fluidly communicable with the oxidant and fuel reactants such that combustion can occur, ~~and~~the heater mounted in sufficient thermal proximity to the fuel cell that the fuel cell can be heated by the combustion to an operating temperature, the heater comprising a sufficiently porous outer tube to enable the fuel and air reactants to pass through the outer tube.

2.-4. (Canceled)

5. (Currently amended) A system as claimed in claim 1[3], further comprising:

a tubular thermal casing, the inside of which defines a first reactant chamber that contains the at least one fuel cell and the heater, and can contain the reactant that is fluidly communicable with the outer electrode layer, wherein ~~the heater is tubular and has a sufficiently porous wall to enable the fuel and air mixture to pass through the combustion heater into the reactant chamber, and~~ the pores of the outer tube of the heater are coated with catalytic material effective to combust a mixture of the air and fuel flowing through the outer tube~~heater~~.

6.-8. (canceled)

9. (Currently amended) A solid oxide fuel cell system ~~as claimed in claim 2~~comprising:

(a) at least one tubular solid oxide fuel cell comprising a ceramic solid state electrolyte layer and inner and outer electrode layers concentrically arranged around and sandwiching the electrolyte layer, the inner electrode layer fluidly communicable with only one of an oxidant reactant and a fuel reactant, and the outer electrode layer fluidly communicable with only the other of the oxidant and fuel reactants;

(b) a tubular combustion heater, the inside of which contains the at least one fuel cell, the heater fluidly communicable with the oxidant and fuel reactants such that combustion can occur; and

(c) a tubular thermal casing, the inside of which defines a first reactant chamber that contains the at least one fuel cell and the heater,

wherein ~~the heater is tubular and~~ the heater and casing are arranged to define an annular chamber therebetween that is fluidly communicable with an air and fuel mixture, and one or both of the heater and casing are coated with catalytic material effective to combust the air and fuel mixture.

10. (Original) A system as claimed in claim 9, wherein the inside of the tubular heater defines an oxidant chamber, and the system comprises the at least one fuel cell located within the oxidant chamber.

11. (Original) A system as claimed in claim 10 wherein the at least one fuel cell is embedded in a solid state porous foam matrix inside the oxidant chamber.

12. (Currently amended) A solid oxide fuel cell system comprising

(a) at least one tubular solid oxide fuel cell comprising a ceramic solid state electrolyte layer and inner and outer electrode layers concentrically arranged around and sandwiching the electrolyte layer, the inner electrode layer fluidly communicable

with only one of an oxidant reactant and a fuel reactant, and the outer electrode layer fluidly communicable with only the other of the oxidant and fuel reactants; and

(b) a combustion heater comprising a first tube, ~~and~~ a dense second tube within the first tube, ~~the inside of the second tube defining~~ and a porous third tube inside the second tube, an annular space in between the second and third tubes defining a combustion air chamber, and an inside of the third tube defining a combustion fuel chamber, the combustion air chamber fluidly communicable with the oxidant and ~~fuel reactants~~ the combustion fuel chamber fluidly communicable with the fuel, the third tube sufficiently porous to enable the fuel and air reactants to pass through the third tube such that combustion can occur, and an annular space between the first and second tubes defining a reactant heating chamber fluidly communicable with one of the ~~reactants~~ oxidant reactant and the fuel reactant and thermally coupled to the combustion air chamber such that heat generated from the combustion is transferable to the reactant inside the reactant heating chamber.

13. (Canceled)

14. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 1[3] wherein ~~the~~ the heater further comprises a dense inner tube within the outer tube, the inside of the inner tube defining a combustion chamber ~~the reactant~~ fluidly communicable with the ~~outer electrode layer and~~ oxidant and fuel reactants such that combustion can occur, an annular space between the inner and outer tubes defining a ~~the~~ reactant heating chamber ~~is oxidant, and the first tube is~~ fluidly communicable with one of the oxidant reactant and the fuel reactant and thermally coupled to the combustion chamber such that heat generated from the combustion is transferable to the reactant inside the reactant chamber, the outer tube sufficiently porous to enable ~~oxidant~~reactant heated inside the heating chamber to pass through ~~first~~ outer tube and communicate with the outer electrode layer.

15.-17. (Canceled)

18. (Currently amended) A solid oxide fuel cell system as claimed in claim 12[3] wherein ~~the heater further comprises a porous third tube inside the second tube, an annular space in between the second and third tubes defining a combustion air chamber, and an inside of the third tube defining a combustion fuel chamber, the combustion air chamber fluidly communicable with the oxidant and~~ the combustion fuel chamber is fluidly communicable with the fuel at a higher pressure than the combustion air chamber is fluidly communicable with the oxidant, thereby causing fuel to permeate radially through the third tube and into the combustion air chamber for combusting with the oxidant therein.

19. (Currently amended) A solid oxide fuel cell system as claimed in claim 12[3] wherein ~~the heater further comprises a porous third tube inside the second tube, an annular space in between the second and third tubes defining a combustion air chamber, and an inside of the third tube defining a combustion fuel chamber, the combustion air chamber fluidly communicable with the oxidant and~~ the combustion fuel chamber is fluidly communicable with the fuel at a lower pressure than the combustion air chamber is fluidly communicable with the oxidant, thereby causing oxidant to permeate radially through the third tube and into combustion fuel chamber for combusting with the fuel therein.

20. (Currently amended) A solid oxide fuel cell system ~~as claimed in claim 13 wherein the heater further comprises~~ comprising:

(a) at least one tubular solid oxide fuel cell comprising a ceramic solid state electrolyte layer and inner and outer electrode layers concentrically arranged around and sandwiching the electrolyte layer, the inner electrode layer fluidly communicable with only one of an oxidant reactant and a fuel reactant, and the outer electrode layer fluidly communicable with only the other of the oxidant and fuel reactants; and

(b) a combustion heater comprising a first tube, a dense second tube within the first tube and a porous third tube inside the second tube, an annular space in between the second and third tubes defining a first combustion chamber, and an inside of the third tube defining a second combustion chamber, the first combustion chamber

having an exhaust outlet and the second combustion ~~fuel~~ chamber fluidly communicable with the fuel and oxidant, the fuel and oxidant forming a mixture therein that permeates radially through the third tube and into the first combustion chamber for combusting, and an annular space between the first and second tubes defining a reactant heating chamber fluidly communicable with one of the reactants and thermally coupled to the first combustion chamber such that heat generated from the combustion is transferable to the reactant inside the reactant chamber.

21. (Original) A solid oxide fuel cell system as claimed in claim 20 further comprising an flame igniter in the first combustion chamber and effective to ignite the fuel and oxidant mixture therein for combustion by flame burning.

22. (Previously presented) A solid oxide fuel cell system as claimed in claim 20 wherein the pores of the third tube are coated with a catalytic material sufficient to catalytically combust the oxidant and fuel mixture passing therethrough.

23. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in~~of~~ claim 1 wherein the ~~combustion~~ heater further comprises; ~~a porous outer tube and~~

a porous inner tube within the outer tube, an inside of the inner tube defining an inner combustion chamber fluidly communicable with the oxidant and fuel reactants which form a mixture therein, and an annular space between the first and second tubes defining an outer combustion chamber in which fuel and oxidant mixture radially permeating through the inner tube is combusted.

24. (Currently amended) A ~~solid oxide fuel cell~~ system ~~of~~as claimed in claim 23 further comprising a flame igniter in the outer combustion chamber and effective to ignite the fuel and oxidant mixture therein for combustion by flame burning.

25. (Currently Amended) A ~~solid oxide fuel cell~~ system as claimed in claim 23 wherein the pores of the inner tube are coated with a catalytic material sufficient to catalytically combust the oxidant and fuel mixture passing therethrough.

26. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 5 further comprising a tubular flame arrestor surrounding the heater, the flame arrestor having pores or perforations with a maximum size that is smaller than the quenching diameter of the fuel.

27. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 10 further comprising a porous flame arrestor located in the annular chamber and having a maximum pore size smaller than the quenching diameter of the fuel-air mixture flowing through the annular chamber.

28. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 27 wherein the flame arrestor is a porous or perforated cylindrical layer located in the annular chamber such that a pair of annular compartments are defined on either side of the cylindrical layer, wherein one compartment is large enough to receive an air/fuel mixture and distribute the mixture uniformly through the cylindrical layer, and the other compartment has a thickness large enough for flames to form therein.

29. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 10 further comprising a cylindrical porous catalytic layer located inside the annular chamber such that a pair of annular compartments are defined on either side of the layer and composed of a porous material with pores coated with catalytic material that promotes combustion of a fuel/air mixture in the annular chamber.

30.-33. (Canceled)

34. (Previously presented) A system as claimed in claim 5 wherein the heater further comprises an electric resistive element that generates sufficient heat to heat the catalytic material to an operating temperature.

35. (Previously presented) A system as claimed in claim 5 wherein the heater comprises a flame burner fluidly communicable with the air and the fuel and operable to ignite the air and fuel to generate a flame and sufficient heat to heat the catalytic material to an operating temperature.

36. (Previously presented) A solid oxide fuel cell system as claimed in claim 21 wherein the pores of the third tube are coated with a catalytic material sufficient to catalytically combust the oxidant and fuel mixture passing therethrough.

37. (Currently amended) A ~~solid oxide fuel cell~~ system as claimed in claim 24 wherein the pores of the inner tube are coated with a catalytic material sufficient to catalytically combust the oxidant and fuel mixture passing therethrough.

38. (New) A system as claimed in claim 14 wherein the heater is tubular and is at least partly filled with a porous flame arrestor that has a maximum pore size that is smaller than the quenching diameter of the fuel.

39. (New) A system as claimed in claim 23 wherein the heater is tubular and is at least partly filled with a porous flame arrestor that has a maximum pore size that is smaller than the quenching diameter of the fuel.

40. (New) A system as claimed in claim 14 wherein the heater further comprises a flame burner fluidly coupled to an inlet end of the combustion chamber, and fluidly communicable with the fuel and oxidant such that the fuel and oxidant are ignited to form a flame.

41. (New) A system as claimed in claim 23 wherein the heater comprises a flame burner fluidly communicable with the air and the fuel and operable to ignite the air and fuel to generate a flame and sufficient heat to heat the catalytic material to an operating temperature.